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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,438	02/07/2006	Ernest Grimberg	31322	5035

67801 7590 05/19/2009

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EXAMINER	
GREEN, YARA B	

ART UNIT	PAPER NUMBER
2884	

MAIL DATE	DELIVERY MODE
05/19/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,438	GRIMBERG, ERNEST	
	Examiner	Art Unit	
	YARA B. GREEN	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *62-72 and 74-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *62-72, 74-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/26/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Applicant's Amendment filed January 26, 2009. Claims 62, 74, 75, 78, and 79 have been amended. Claims 73, 62 and 83 have been cancelled. No claims have been added. Currently, claims 62-72 and 74-81 are pending.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on January 26, 2009 was filed after the mailing date of the Non-Final Rejection on September 25, 2008. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Response to Arguments

2. Applicant's arguments have been fully considered but they are not persuasive. Applicant asserts that Allen (US 7,030,378) fails to teach an infrared camera comprising a same signal reference temperature to calculate the true temperature of an objection within the camera's field of view. The Examiner politely disagrees. Allen distinguishes between calibrations due ambient temperature readings that affect the overall temperature of the sensor and calibrations due to the non-uniformity of the pixels in an array (col. 4, lines 16-35) and recommends compensating for both. The temperature of the detector is measured and accounted for in the calibration of the detector (col. 16, lines 5-20). Allen further teaches compensating for non-uniformities of the detector on a pixel-by-pixel basis (col. 16, lines 22-30). Allen does not suggest, however, the order to which the calibration is performed (i.e. applying ambient temperature correction to non-uniformity correction or vice

versa) which allows one of ordinary skill in the art, absent some degree criticality, to determine the order that optimizes the calibration.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 62-64, 66, 67,** and **71-73** are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US Patent No. 7,030,378; filed August 5, 2003)

Re **claim 62**, Allen et al. disclose an infrared imaging camera comprising:

an uncooled and unshielded detector comprising an array of infra-red (IR) sensors (col. 10, lines 26-30) arranged to detect infrared radiated energy (col. 4, lines 3-10, lines 50-64);

a non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said arrays to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (col. 16, lines 22-30);

a calibrator to carry out periodic calibration operations (col. 28, lines 46-53; col. 21, lines 17-26) by taking at least one calibration temperature measurement over said camera and to derive from said at least one calibration temperature measurement a reference temperature indicative of radiation energy not from an external scene (col. 23, lines 10-25), such that the reference temperature and the detector response to radiated energy impinging on said detector allow a temperature of objects in said camera's field of view to be calculated (col. 5, lines 53-67; col. 4, lines 1-40) using a same signal

to temperature function for each of said outputs to obtain a temperature, wherein said reference temperature is a parameter of said function (col. 16, lines 5-20).

As mentioned earlier, Allen does not suggest the order to which the calibration is performed (i.e. applying ambient temperature correction to non-uniformity correction or vice versa) which allows one of ordinary skill in the art, absent some degree criticality, to determine the order that optimizes the calibration.

Re **claim 63**, Allen et al. disclose wherein the infrared imaging camera is configured to combine a value from an initial calibration measurement with a second value taken from a second calibration measurement, said combining using a time-dependent function to produce extrapolations of said corrections for later points in time after said calibration temperature measurements (col. 25, lines 1-23).

Re **claim 64**, Allen et al. disclose wherein said time-dependent function comprises a mathematical extrapolation function from most recent calibration temperature measurements (col. 25, lines 1-23).

Re **claim 66**, Allen et al. disclose wherein the infrared imaging camera is configured to make said correction using an initial value which is a function of a temperature measurement of a housing of said camera (col. 5, line 65 - col. 6, lines 4).

Re **claims 67** and **72**, Allen et al. disclose wherein the calibration measurements are made at intervals less than the thermal time constant of the camera (col. 10, lines 25-50; col. 23, lines 20-25). It follows that repeated measurements during the changing temperature of the camera falls within the thermal time constant of the camera.

Re **claim 71**, Allen et al disclose wherein the uncooled detector comprises a microbolometer array (col. 5, lines 28-40) where it follows that bolometers used in thermal cameras may include microbolometers.

5. **Claims 65, 68, 69, 74-80, 82,** and **83** are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US Patent No. 7,030,378; filed August 5, 2003) in view of Tsuchimoto et al. (EP 0837600; published April 22, 1998).

Re **claims 65** and **68**, Allen et al. disclose the limitations of claim 62, as mentioned above, but do not teach making a correction using a temperature of the shutter of the camera. Allen et al. do teach, however, aiming the infrared camera at a blackbody whose temperature is known in order to correct for non-uniformities amongst the detector elements (col. 20, lines 1-9) but are silent with regards to origin of the blackbody. In a similar field of endeavour, Tsuchimoto et al. disclose measuring the radiation of the camera's closed shutter whose temperature is known by virtue of an attached thermistor in order to correct for non-uniformities amongst the detector elements. The radiation emitted from the shutter is treated as blackbody radiation (page 6, lines 36-48; page 4, line 58 - page 5, line 4). One of ordinary skill in the art would have been motivated to implement the shutter temperature as the calibration source of Allen et al. as taught by Tsuchimoto et al. in order to provide an easy and quick method for calibration without having to include a separate mechanism for inserting a reference blackbody source.

Furthermore, Allen et al. teach wherein a sensor is located external to the surface of the vacuum packaging and a sensor is located on a case surrounding the optics of the camera (col. 5, line 61 - col. 6, line 4). Allen et al. is silent with regards to the type of sensor used for temperature measurement, thereby allowing for that which is well known in the art. Tsuchimoto et al. teach

thermistors to be suitable sensors for measuring the temperature of a desired area of an infrared camera. Therefore, it would have been obvious to one of ordinary skill in the art to implement thermistors as the sensors of Allen et al., as taught by Tsuchimoto et al., as they have been demonstrated to be acceptable temperature detectors.

Re **claim 69**, Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 65 as mentioned above. The blackbody of Allen et al. inherently requires the emissivity to be substantially approaching one (see discussion of claims 65 above).

Re **claims 74** and **75**, Allen et al. disclose a temperature correction apparatus, for correcting a response of a radiometer in accordance with a local camera temperature, said radiometer comprising:

an unshielded uncooled infrared (IR) detector comprising an array of IR sensors (col. 10, lines 26-30) for providing an image response in order to form a temperature image in accordance with IR radiation impinging on said IR sensor's field of view (FOV) (col. 4, lines 3-10, lines 50-64);

a non-uniformity corrector, associated with said detector, operable to perform non-uniformity correction on output of said array to provide uniform outputs having a uniform response to energy detected at said uncooled sensor (col. 16, lines 22-30).

As mentioned earlier, Allen does not suggest the order to which the calibration is performed (i.e. applying ambient temperature correction to non-uniformity correction or vice versa) which allows one of ordinary skill in the art, absent some degree criticality, to determine the order that optimizes the calibration.

Allen et al. do teach aiming the infrared camera at a blackbody whose temperature is known in order to correct for non-uniformities amongst the detector elements (col. 20, lines 1-9) but is silent with regards to origin of the blackbody. In a similar field of endeavour, Tsuchimoto et al.

disclose measuring the radiation of the camera's closed shutter whose temperature is known by virtue of an attached thermistor in order to correct for non-uniformities amongst the detector elements. The radiation emitted from the shutter is treated as blackbody radiation (page 6, lines 36-48; page 4, line 58 - page 5, line 4). One of ordinary skill in the art would have been motivated to implement the shutter temperature as the calibration source of Allen et al. as taught by Tsuchimoto et al. in order to provide an easy and quick method for calibration without having to include a separate mechanism for inserting a reference blackbody source.

Allen et al. further teach where such calibration involve a reference for deriving a reference temperature indicative of radiated energy not from an external scene and for approximating a temporal drift of local temperature (col. 4, lines 15-30) and correcting the signal representative of the temperature of objects in the radiometer's field of view (col. 4, lines 35-45; col. 5, line 62-col. 6, line 4; col. 20, lines 1-9).

Re **claim 76,** Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 74, as mentioned above. Allen et al. further teach wherein said approximation is a mathematical functional approximation based on previous measured data (col. 25, lines 1-23).

Re claim **77**, Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 74, as mentioned above. Allen et al. further disclose wherein the IR sensor array is operable to provide a two-dimensional image (col. 4, lines 1-8).

Re claim **78,** Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 74, as mentioned above. Allen et al. further disclose wherein the IR sensor comprises an array of microbolometers (col. 5, lines 28-40) where it follows that bolometers used in thermal cameras may include microbolometers, and wherein said signal corrector is operable to calculate a difference

between a bolometer level and a reference level comprising an average video signal of the IR sensor, and to use said difference to produce said correction (col. 6, lines 32-45).

Re claims **79** and **80** the limitations disclosed essentially recite the limitations of claims 74, 75, and 76, and therefore are rejected similarly.

6. **Claims 70** is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US Patent No. 7,030,378; filed August 5, 2003) in view of Tsuchimoto et al. (EP 0837600; published April 22, 1998) and further in view of Everest (US Patent No. 4,907,895; published March 13, 1990).

Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 65, as mentioned above, but do not teach the shutter to be reflective. In a similar field of endeavour, Everest teaches coating at least part of the internal side of a shutter so that it highly reflective (i.e. has a reflectivity substantially approaching 1) to the infrared radiation generated by the sensor. This allows for the shutter to act as a mirror to the sensor so that it may be able to detect radiation resulting from the detector and not from the field of view (col. 3, lines 13-18; col. 4, lines 52-67; col. 5, lines 10-15). It would have been obvious to one of ordinary skill in the art for the shutter to comprise a material that may reflect radiation indicative of the uncooled detector, as taught by Everest, in the apparatus of Allen et al., as modified by Tsuchimoto et al., in order to eliminate erroneous signals due to heating of the detector.

7. **Claims 81** is rejected under 35 U.S.C. 103(a) as being unpatentable over Allen et al. (US Patent No. 7,030,378; filed August 5, 2003) in view of Tsuchimoto et al. (EP 0837600; published April 22, 1998) in view of Frey (US Patent No. 5,925,875; published July 20, 1999).

Allen et al., as modified by Tsuchimoto et al., teach the limitations of claim 79, as mentioned above but are silent with regards to filtering the image signal in order to compensate for modulated transfer function effects. In a similar field of endeavour, Frey teaches using a high pass filter in conjunction with a focal plane array in order to remove the unwanted temporal noise and fixed pattern noise components of an image signal (i.e. MTF effects) (col. 5, lines 50-61; col. 6, lines 45-65). One of ordinary skill in the art would have been motivated to implement the filtering of Frey in the method of Allen et al., as modified by Tsuchimoto et al., in order to remove noise components of an image.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YARA B. GREEN whose telephone number is (571)270-3035. The examiner can normally be reached on Monday - Thursday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Porta/
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Yara B. Green
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